

ABSTRACT OF THE DISCLOSURE

In a coding apparatus and a decoding apparatus, the performance of codes is improved by optimizing a degree sequence and a quantization step size. The coding apparatus includes a degree sequence calculator for calculating a degree sequence indicating the distribution of the number of 1s in the parity check matrix, a parity check matrix generator for producing a parity check matrix on the basis of the degree sequence calculated by the degree sequence calculator, and an encoder for coding the input data using the parity check matrix generated by the parity check matrix generator. The degree sequence calculator optimizes the degree sequence such that when, in the decoding apparatus for decoding coded data, a received value and a message are represented by a small number of bits, the error probability after decoding is minimized for a given variance of noise or the allowable variance of noise is maximized for a given error probability after decoding.